Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (original): A semiconductor milling endpoint detection system comprising:

a focused ion beam (FIB) apparatus for directing a focused ion beam at an integrated circuit sample, wherein a charge pulse is generated each time an ion from the beam strikes the sample;

a plurality of charge pulse detection electronics (CPDE) components, wherein the CPDE components are coupled to the sample; and

a histogram display.

Claim 2 (original): The endpoint detection system of claim 1, wherein the CPDE components comprise:

a charge preamplifier directly coupled to a layer of interest within the sample and configured to amplify and integrate the charge pulse to produce a voltage pulse indicative of the size of the charge pulse;

a pulse amplifier directly coupled to the charge preamplifier and configured to amplify the voltage pulse;

a pulse shaper directly coupled to the pulse amplifier and configured to optimize the shape of the voltage pulse to a height proportional to the charge pulse; and

a multi-channel analyzer (MCA) directly coupled to the pulse shaper and configured to detect the height of the shaped pulse and sort the shaped pulse into one of a plurality of channels, wherein each channel is associated with a range of shaped pulse heights.

Claim 3 (currently amended): The endpoint detection system of claim 1, wherein the histogram display comprises:

an X-axis divided into a plurality of channels;

a Y-axis representing an event count, wherein ~~an~~ the event count is generated each time an ion strikes the sample;

a distribution curve, wherein the curve is formed by plotting ~~each~~ the event count into an ~~the~~ appropriate channel based on ~~the~~ a height of each shaped pulse.

Claim 4 (currently amended): The endpoint detection system of claim 3, wherein the system is ~~can be~~ calibrated by milling a reference sample similar in construction to the integrated circuit sample and obtaining a reference curve for each layer within the reference sample.

Claim 5 (currently amended): The endpoint detection system of claim 4, wherein a noticeable shift in the distribution curve indicates that milling has completed on a layer within the integrated circuit sample.

Claim 6 (currently amended): The endpoint detection system of claim 5, wherein a milling endpoint ~~can be~~ is detected by comparing the distribution curve formed immediately prior to the shift with the reference curves.

Claim 7 (currently amended): The endpoint detection system of claim 3, wherein the histogram display ~~can be~~ is refreshed on command.

Claim 8 (original): The endpoint detection system of claim 1, wherein the CPDE components comprise:

a charge preamplifier, wherein the charge preamplifier is directly coupled to a layer of interest within the sample;

a pulse shaper directly coupled to the charge preamplifier;

a pulse amplifier directly coupled to the pulse shaper; and

a multi-channel analyzer (MCA) directly coupled to the pulse amplifier.

Claim 9 (original): The endpoint detection system of claim 1, wherein the CPDE components comprise:

a charge preamplifier is directly coupled to a layer of interest within the sample;

a spectroscopy amplifier directly coupled to the charge preamplifier; and

a multi-channel analyzer (MCA) directly coupled to the spectroscopy amplifier.

Claim 10 (currently amended): A method for detecting a focused ion beam milling endpoint on a semiconductor ~~sample~~ comprising:

striking an integrated circuit sample with an ion beam generated by a focused ion beam (FIB) apparatus;

utilizing a plurality of charge pulse detection electronics (CPDE) components to detect and configure a charge pulse generated each time an ion from the beam strikes the integrated circuit sample; and

creating a distribution curve on a histogram display based on output of the CPDE components.

Claim 11 (original): The method of claim 10, wherein the CPDE components comprise:

a charge preamplifier directly coupled to a layer of interest within the sample and configured to amplify and integrate the charge pulse to produce a voltage pulse indicative of the size of the charge pulse;

a pulse amplifier directly coupled to the charge preamplifier and configured to amplify the voltage pulse;

a pulse shaper directly coupled to the pulse amplifier and configured to optimize the shape of the voltage pulse to a height proportional to the charge pulse; and

a multi-channel analyzer (MCA) directly coupled to the pulse shaper and configured to detect the height of the shaped pulse and sort the shaped pulse into one of a plurality of channels, wherein each channel is associated with a range of shaped pulse heights.

Claim 12 (currently amended): The method of claim 10, wherein the histogram display comprises:

an X-axis divided into a plurality of channels;

a Y-axis representing an event count, wherein ~~an~~ the event count is generated each time an ion strikes the sample;

a distribution curve, wherein the curve is formed by plotting ~~each~~ the event count into ~~the~~ an appropriate channel based on ~~the~~ a height of each shaped pulse.

Claim 13 (currently amended): The method of claim 12, wherein the histogram display ~~can be~~ is calibrated by milling a reference sample similar in construction to the integrated circuit sample and obtaining a reference curve for each layer within the reference sample.

Claim 14 (currently amended): The method of claim 13, wherein a noticeable shift in the distribution curve indicates that milling has completed on a layer within the integrated circuit sample.

Claim 15 (currently amended): The method of claim 14, wherein a milling endpoint ~~can be~~ is detected by comparing the distribution curve formed immediately prior to the shift with the reference curves.

Claim 16 (currently amended): The method of claim 12, wherein the histogram display ~~can be~~ is refreshed on command.

Claim 17 (original): The method of claim 10, wherein the CPDE components comprise:

a charge preamplifier, wherein the charge preamplifier is directly coupled to a layer of interest within the sample;

a pulse shaper directly coupled to the charge preamplifier;

a pulse amplifier directly coupled to the pulse shaper; and

a multi-channel analyzer (MCA) directly coupled to the pulse amplifier.

Claim 18 (original): The method of claim 10, wherein the CPDE components comprise:

a charge preamplifier is directly coupled to a layer of interest within the sample;

a spectroscopy amplifier directly coupled to the charge preamplifier; and

a multi-channel analyzer (MCA) directly coupled to the spectroscopy amplifier.

Claim 19 (original): An integrated circuit sample milled according to a process comprising the steps of:

striking the sample with an ion beam generated by a focused ion beam (FIB) apparatus;

detecting and configuring a charge pulse generated each time an ion from the beam strikes the sample with a plurality of charge pulse detection electronics (CPDE) components; and

generating a distribution curve on a histogram display based on output of the CPDE components.

Claim 20 (original): The sample of claim 19, wherein the CPDE components comprise:

a charge preamplifier directly coupled to a layer of interest within the sample and configured to amplify and integrate the charge pulse to produce a voltage pulse indicative of the size of the charge pulse;

a pulse amplifier directly coupled to the charge preamplifier and configured to amplify the voltage pulse;

a pulse shaper directly coupled to the pulse amplifier and configured to optimize the shape of the voltage pulse to a height proportional to the charge pulse; and

a multi-channel analyzer (MCA) directly coupled to the pulse shaper and configured to detect the height of the shaped pulse and sort the shaped pulse into one of a plurality of channels, wherein each channel is associated with a range of shaped pulse heights.

Claim 21 (currently amended): The sample of claim 19, wherein the histogram display comprises:

an X-axis divided into a plurality of channels;

a Y-axis representing an event count, wherein ~~an~~ the event count is generated each time an ion strikes the sample;

a distribution curve, wherein the curve is formed by plotting ~~each~~ the event count into ~~the~~ an appropriate channel based on ~~the~~ a height of each shaped pulse.

Claim 22 (original): The sample of claim 21, wherein a noticeable shift in the distribution curve indicates that milling has completed on a layer within the sample.

Claim 23 (currently amended): The sample of claim 22, wherein a milling endpoint ~~can be~~ is detected by comparing the distribution curve formed immediately prior to the shift with the reference curve~~s~~.